Teaching Pain Management to Student Nurses: A Literature Review

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Purpose: To provide nursing students knowledge of pain prior, during, and post- surgery, recovery and rehabilitation.

Methods: Review articles published during 2005 until 2012 that focused on pain assessment and pain management. The databases used in this study were Medline and CINAHL.

Results: Postoperative pains need special approach and care. It needs teach patient how to adapt pain, control pain, monitor result of treatment.

Conclusion: Nursing students need to learn how to assess pain using appropriate tools for each age level and in patients with special needs. The students also need to learn about pain management including pharmacology and non-pharmacology means and consider pain as the fifth vital sign. As student nurses learn pain assessment, they should be considerate about culture, and different languages that might happen during practical rotations.

Key words: pain assessment, pain management, student nurses

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Introduction

The most common definition of pain is "an unpleasant sensory and emotional experience associated with actual and potential tissue damage" (IASP, 2010, p.1). The Joint Commission International (JCI) is an accredited organization with a mission to provide patient safety and care around the world. This organization provides standards for hospitals around the world such as pain management. JCI estimated that there are more than seventy six million people in the United States who are currently experiencing or have had these three types of pain (e.g. chronic, acute pain, and post-surgical pain). Pain may increase the length of stay (LOS) in post- operative situations and can have financial and psychological implications. As a teacher of student nurses, it is imperative that students grasp the concept of pain. Students should have knowledge of pain mechanisms, control, assessment and management.

In 2011, JCI released standards about pain management. The standards require an organization to "respect and support patient's right to appropriate assessment and management of pain" (JCI, 2011, p.66). The JCI also stressed that the organization's staff should be able to properly assess: patient's pain, including the effects of pain, how the pain was reported, and how to manage pain. According to Indonesian laws, patients have the right to get health services with professional and good standards, to get effective and efficient care standards free from physical losses (Indonesian Law, 2009).

Hence, pain assessment and pain management are very important in patient care, especially for students who have clinical rotations in the orthopedic ward when there are many patients who have had post musculoskeletal surgery. They need to assess not just what pain is but types of pain. The first type of pain is nociceptive pain that is caused by activity in neural pathways in response to potentially tissue-damage stimuli (e.g. somatic, visceral, post-operative, sprain, inflammation, injury). The second type is neuropathic or neurogenic pain that arises from damage or injured nervous tissue.

In 2012, the number of total knee replacement (TKR) surgery in one of private hospital at Yogyakarta Indonesia was eighty two patients in January to February 2013. There were fourteen patients experienced of pain. The experience of pain from post musculoskeletal surgery includes such factors as inflammation is classified as acute pain. Acute pain is caused by noxious stimulation due to injury (e.g. post traumatic, post-operative). On the other hand, chronic pain is related to psychological factors, and the period is 1-6 months. It can be nociceptive or neuropathic.

Student nurses need to be taught how to assess pain to the patients and consider the options available for reducing pain for their patients. Nurses should be able to assess and give pain management. Nurses should have knowledge about pain management before educating patients. Student nurses also have the same information when they come to do their clinical rotations to take care patients with musculoskeletal surgery. Wallace et al. (1995) identify two barriers for nurses in regards to pain: nurses lack information about pain management, and nurses do not know how to assess their patients' pain. The second barrier is related to the lack of tools to identify and rate pain and the response to medications or non- pharmacological approaches based on evidence-based practice (Wallace et al., 1995, as cited by McNamara, Harmon & Sauders, 2012). Based on observations in the surgical ward at one of private hospital in Yogyakarta Indonesia, there is no format or standardized tool to assess pain. Nurses may administer pain medications based on the surgeon's order, but nurses on this unit do not consider any of the other non-pharmacology pain management strategies that nurses can implement on their own as adjuncts to the medications. There is a lot of evidence based on non-pharmacology pain management for post musculoskeletal surgery. In Yogyakarta Indonesia, most nurses have barriers to adopt pain management with evidence- based practice due to barriers in language, as these documents and evidenced based guidelines are not written in the spoken or written language of Indonesia. Based on identification of these barriers to

pain management in post-operative patients, students should be able to take care of patients with pain during practical in hospital. Also, they need a brief review of the literature on pain and assessment tools to measure pain sensations prior and post nursing interventions; they will be discussed as it pertains to the role of nurse educators in Indonesia. The objective of this study is to provide nursing students knowledge of pain prior, during, and post- surgery, recovery and rehabilitation.

Methods

The data based used were Medline and CINAHL with 25 articles. The articles were published during 2005 until 2012 about pain assessment, pain management, postoperative pain, pain on patient with special need.

Results

Pain

McCaffery as cited by Pasero (2007) stated pain is "whatever the experiencing person says it is, and exists whenever he says it does" (p.1). Patients with post-surgery or who have injuries were classified as having acute pain. The location of injury will activate the nociceptor system. Then, it will lead to cell injury and inflammation which promotes the releasing of cytokine.

Pain is a multifactorial concept that includes both acute and chronic episodes: that is both objective and subjective and affects one physically and psychologically. Acute pain is defined as pain of recent onset and probable limited duration. "It usually has an identifiable temporal and causal relationship to injury or disease" (Ready & Edward, as cited in Australian and New Zealand College of Anesthetist and Faculty of Pain Medicine, 2010, p. 1). Damage to the tissue due to surgery caused by peripheral sensory neurons will make synapses send the

pain signal to the brain. Therefore, the sensory input from the surgical incision will produce stress that leads to the release of chemical mediators, adrenal cortex, and immune system.

Besides the physiological changes, there is also the subjective experience that contributes to pain as well. An example of a patient's previous pain experience will influence themselves to express their feelings about pain during the second experience of pain. There are also psychological factors related to pain experience, such as "processes attention, cognitive, behavioral responses and interaction with persons' environment" (Australian & New Zealand College of anesthetist and faculty of pain medicine, 2010, p. 7). The following table is characteristic of nociceptive and neurophatic pain.

Table *1 Characteristic of Nociceptive and Neuropathic Pain*

	Nociceptive pain	Neurophatic pain
Subtypes	Somatic : sharp, stabbing, able to the localized	Related with sensory loss, associated with increases sympathetic activity (e.g. changes in skin temperature and sweating)
	Visceral : dull, heavy, aching pain that may occur in a wide area.	Pain is described as burning, stinging, or pricking.
Duration	Less than three months	More than three months
Causes	Stimulation of nociceptors in response to inflammation or damage (e.g. post-operative, fracture)	Associated with injury or disease of the peripheral or central nervous system (e.g. post-herpetic neuralgia after shingles or phantom limb pain)
Management	Multimodal analgesia Opioid therapy, for example morphine or oxycodone	Poor response to opioid considers the use of adjuvant, for example antidepressant or anticonvulsant therapy

Note. Adapted from "Basic Principles of pain management: assessment and intervention" by Cox F, 2010, *Nursing Standard 8* (25), 37-39.

Visceral pain originated from internal organs such as intestines (i.e. appendicitis). Deep somatic pain comes from tendons, muscles, joints, and periosteum. Chronic post-surgical pain (CPSP) is defined as pain persisting longer than three months after surgery. Researchers found from a literature review that CPSP has five domains as risk factors such as

demographic, pain, clinical, surgery-related and psychological (Van Den Kerkhof et al., 2013, p.3). In surgery-related terms, duration of surgery and type of surgery will influence trauma and inflammation processes.

The following section will include various tools that are used by nurses or student nurses to assess a patient's pain. This is essential not only to quantify the pain to see if it's worsening or improving, but also to reassess after an intervention is done to evaluate if there are other options to pursue such as, medication, ice, or massage to relieve the distress of the pain.

Pain Assessment

Pain is considered the fifth vital sign along with pulse, respiration, blood pressure and temperature. According to a short questionnaire of several student nurses in one of nursing academy at Yogyakarta Indonesia, the students did not have enough information about pain as the fifth vital sign. As a nurse educator teaches about pain assessment it is a foundation to prepare nursing students before clinical rotations. Moreover, inconsistent assessment of pain may lead to inadequate pain management. Therefore, inadequate pain management may interfere with the healing process. Also, unmanaged pain after surgery might cause pulmonary complications due to muscle spasms that lead patients to have difficulties with effective coughing, thus lead excessive secretions with a risk of pneumonia (Yüceer, 2011). Yüceer also mentioned that patients who get severe pain also experience: decrease in ability to be mobile, risk of constipation, increased blood pressure, and risk of venous thromboembolism. Assessment of pain is a very important role of nurses and nursing students in pain management. Inability to assess pain will affect patient care. There are tools of pain assessment, such as Visual Analogue Scale (VAS), Numeric Rating Scale, Verbal Rating Scale (VRS), Wong Baker Faces, CRIES Scale, and Behavior Scale. However, not all the

tools are applicable to every patient population or setting. For example, some are more frequently used for non-verbal children.

There are hospitals' policies on using these pain tools in the clinical settings with some hospitals asking for a pain assessment before and after medication administration. For example, every hospital has different guidelines. The Health Regulatory Board in the U.S. has legislated guidelines on pain assessment. Since 2000, pain has become the fifth vital sign by The Joint Commission on Accreditation of Health Care Organization. In other words, nurses and student nurse should be able to do pain assessment in a consistent manner and provide good documentation on patients' charts. Hence, they do not only measure other vital signs such as temperature, pulse, respiratory and blood pressure, but also pain assessment. Because pain is the fifth vital sign, it is good to make prompt interventions, fast evaluation and give proper management. As the fifth vital sign, pain should be evaluated as frequently as other vital signs, such as temperature, pulse, respiration and blood pressure.

Acute pain on post orthopedic surgery may develop into chronic pain if not managed well. According to Pasero and McCaffery (2007), orthopedic surgery is one of the most painful surgeries. Peoples' culture, cognitive framework, age, severity, stress, psychology, environments, and experience about pain will effect perceptions of patients' pain. Pain assessment for postoperative patients is very important because pain will affect their quality of life, ability to actively live on a daily basis and their sleep patterns. According to WHO guideline (2007), "pain measurement was standardized using a scale" (p.16-17). Pain assessment after surgery should be done using a pain scale with an objective assessment. Nurses assess pain based on "patients' self- report, patients' facial expressions and body positioning" in other words, on the patients' feelings about pain. Nurses cannot assess pain based on interpretation (Smith, 2012). The WHO (2007) mentioned that the assessment should consider other forms of suffering such as "social, emotional and spiritual suffering" (p.17).

The assessment should be performed regularly after surgery; this is important to evaluate and plan for pain management. Nurses and student nurses are able to do pain assessment by PQRST (Provoking, Quality, Region, Severity, Time). Provoking is to assess precipitating factors that cause pain, for example, what makes pain better or worse. Examples of precipitating factors that lead pain are activity, stress, position, or movement. For the quality of PQRST, patients would use words such as dull, sharp, burn, cramp. Patients should report their pain. Region is to assess the location of patients' pain; for example, patients have deep pain; this is characteristic of visceral pain, hence patients cannot localize the pain. If patients have referred pain it means that the site of pain is different from the injury. Severity is to assess intensity of pain using a scale, and treatment is to assess medication that has already been taken by patients and how medication has impacted the pain. Understanding is to assess the impact of pain and patients' beliefs about the causes of pain, and value is assessing the patients 'goals about pain and comfort level that they received. The important thing during pain assessment is communication between patients and nurses. If patients can not communicate with nurses, another pain scale is needed for patients. In terms of the nature of pain, nurses assess when did the pain start, and how long does the pain last, or is the pain present all the time? Even with advanced pain scales, particular groups, such as children, have different needs when it comes to pain management. The following section is about special needs groups in regards to pain assessment.

Pain Assessment for Infant and Children

Children and infants cannot self-report pain. Hence nurses or student nurses should be able to assess them with specific pain assessment tools. FLACC scale (Face, Legs, Activity, Cry, Consolability) is a behavioral pain assessment that is good for toddlers (1-3years) and also for children with cognitive impairment in any age (IASP, 2010). This pain assessment scale is scored from 0-2, and the total score is between 0-10 (IASP, 2010). Another pain

assessment scale that can be used for children is The Visual Analog Scale (VAS). VAS is good for adults but also good for children 5-6 years old. A study by Williamson & Hoggbart (2005) showed that VAS is more difficult than a Numeric Rating Scale or Verbal Rating Scale. This scale is shows a 10 cm line starting with no pain and ending with worst pain. The limitation of using VAS for pain assessment is that VAS must be managed on paper or electronically (Williamson and Hoggbart, 2005). Another pain assessment scale for children over 3 years old is Faces Pain Rating Scale or Wong-Baker Faces Pain Rating Scale. Wong Baker Faces Assessment Pain Scale uses picture faces and numbers, meaning 0 = smiling face to 10 = crying face. Wong Baker Faces Scale is good for rating pain for children and adults with mild cognitive impairment. The other pain scale is CRIES (Crying Requires oxygen Increased vital signs Expression Sleep) pain scale: this scale is used for neonates (0-6 months). Each category in that scale is scored 0-2 and the total should be 10. Score between 0-3 should be observation at some time and score 4-7 nurses should be considered for administrating analgesics and score 8-10 patients need analgesics to reduce their pain. Nursing students need to learn how to measure patients' pain scale and practice how to use proper measurement tools to enhance their skill in clinical. There is also barrier for students nurse to practice measurement pain scale in hospital due to limitation of tools assessment that provide by hospital. Hence, need collaboration between hospital and school of nursing to provide same guideline or tools pain assessment.

Pain Assessment for Older Adults

Older people have diminished cognition, vision and communication. Nurses and student nurses need to assess pain for this particular group using specific pain scales. Bird et al. (2005) mentioned that nurses might have barriers when assessing pain for older people due to their limitations. Older people have risk of diseases associated with pain, for example,

arthritis, myocardial infarct, cancer, and back pain. Therefore, there needs to be a specific pain assessment scale which can easily be used with the elderly who have health conditions.

For older people with cognitive impairment, nurses are able to use Pain Assessment In Advanced Dementia (PAINAD) scale (McLaffery & Farley, 2008). This tool consists of five items, which are assessed with scoring range of 0-2 and the total score will be 10. McLaffery and Farley also mentioned that to assess pain it is not adequate to use one tool; it would be better to use a combination of tools to provide comprehensive assessment. The other tool assessment that is mostly used for older people is McGill Pain Questioner (MPQ), although there is still an argument about using MPQ in clinical practice (Ballie, Rutledge & Donalson as cited in Bird, 2005). The MPQ is simple and good for older patients with difficulties to describe pain or for elderly who cannot concentrate for long periods. Other pain assessment scales used for older people are VAS, Numerical Rating Scale (NRS), and Verbal Rating Scale (VRS).

Patients with History of Substance Abuse

Patients with history of substance abuse need special attention on assessment and pain management. As health professionals and student nurses assess patients who have abused drugs, they need enough knowledge about the method to assess. Patients use alcohol and drugs for their pain are control/managed by the psychiatric doctor. Patients with addictions and drug abuse may have difficulty managing the pain due to alcohol which will influence affectivity of analgesics, so patients still have pain even though they are using analgesics. In a study by Tsao and Soto (2009) on patients with HIV they found "HIV- positive persons with comorbid psychological and substance use disorder more pain than US population" (p.311).

Furthermore, population patients with HIV/AIDS in Indonesia on 2009 are 18.422 people, and 40.7 percent are drug abusers (Ministry of Health Republic Indonesia, 2009). Tsao and Soto (2009) stated that people with lower "CD4 cell count below 200 have increased

pain" (p.307). Febriani (2010) stated that 68.6 percent patients with HIV have headaches, and lower CD4 cell count below 50. Moreover, Kirsh, Whistcomb, Donaghy and Parsik 2002 stated that patients with HIV/AIDs who have chronic pain are difficult to treat, however it could be "successful and accomplished" (p.S53). Patients with HIV/AIDS are able to treat using higher dose of morphine to relieve their pain. Pain for patients with HIV is caused by multifactor, such as effects of HIV on nervous system. Hence, pain management for those patients needs attention.

Ethnicity –Genetics and Culture

Indonesia has more than 300 ethnicities. They live separately throughout 32 provinces. A study by Suza (2007) on 123 patients with post abdominal and orthopedic surgery of Javanese and Batak ethnics found that different ethnics have different pain experiences. Javanese have moderate pain and Batak have severe pain. The characteristic of Batak is that they are more expressive than Javanese. Other research in this area has not advanced sufficiently in Indonesia. However, Indonesian women reported more pain than men. A study by Goldman (2012) found that women reported pain more than men. Another study by Sniezek (2012), stated that have limbic region between women and men is different; the limbic region for women is a more emotional area and for men it is more in the cognitive area. Hence, women have reported pain more than men due to their emotions being more active than men.

Furthermore, another pain assessment tool that is frequently used is numeric rating pain scale: it uses numbers 0 to 10: 0 means no pain and 10 is the worst pain. In addition, the verbal rating scale is 0 = no pain, 1 = slight pain, 2 = moderate pain, 3 = severe pain and 4 = unbearable pain. Furthermore, nurses' knowledge and ability to assess pain are very important. Nurses are the ones who take care of patients over 24 hours. The ability to assess pain in pain management must be a skill that every nurse especially those who work in

surgical ward possesses. Nurses and nurse students need to improve their knowledge about pain assessment in every age level, including patients with disabilities. Some different populations have been mentioned, such as dementia, low cognition and different cultures. Even though the pain assessment scale was standardized and has been translated into nineteen languages, there are still limitations.

Pain Management Strategies

Non-pharmacology Pain Management

Non-pharmacology pain management is part of the independent role of nurses. As student nurses learning how to practice non-pharmacology technique is good to prepare them before their clinical. This technique should be practical, not only learned in class. This technique is good practice for patients with post-surgery such as in orthopedic surgery. Pain in post-operative musculoskeletal system is classified as most painful. Therefore, it needs a good combination both in pharmacology and non-pharmacology pain management. There are many non-pharmacologic approaches on pain that have been studied. The study includes complementary therapy, music therapy, cold application, imagery and others. A study by Econamidou et al., (2012) using randomized control trial with double blind random control trial which analyzed the effects' of music on 886 patients with elective surgery was effective for reducing post- surgery pain (Level 1). Music is easy to do: it is an inexpensive and not-invasive procedure, so it's safe for patients. A review from the Cochrane data base states that listening to music reduces post-operative pain and opioid requirement (Level 1) (Australian & New Zealand College of Anesthetist and Faculty of Pain Medicine, 2010).

Another method on non-pharmacology pain control is guided imagery. A study by Posadzki and Ernst (2011) used eight randomized clinical trials (RCTs) and showed that guided imagery is significant to reduce musculoskeletal pain.

A third method to reduce pain is using energy healing as a complementary treatment. Research on energy healing in orthopedic conditions, such as fractures, was reported by DiNucci (2005) who found that therapeutic touch helped reduce pain and decrease anxiety. This technique was applied in U.S. hospitals for patients with chronic pain such as wrist fracture, arthritis and AIDS, and cancer. Those hospitals provide complementary and alternative medicine (CAM). Also, there is a lot of research by National Institute of Health on conducting research with CAM. National Center for Complementary Alternative Medicine (NCCAM) found energy healing to be an "adjunctive modality" for a lot of orthopedic pain (DiNucci, 2005, p.264). Lastly, a study by Block (2010) used randomized control trials (RCTs) which found that cold compression on musculoskeletal injury and orthopedic surgery gives positive results for reducing swelling and pain.

Pharmacology Pain Management

Pain management intervention not only uses non-pharmacologic, but also pharmacologic management. Pharmacologic management is needed for patients with acute pain that need medication to relieve pain. The medications are using opioids, epidural catheters, and analgesics. Nurses and student nurses should have knowledge and abilities to manage patients' pain care needs.

Pharmacology intervention needs nurses' skills, such as on monitoring, evaluation and documentation. A study by Coker et al., (2010) stated that patients reported nurses have limited awareness about pain, and recording the pain assessment and pain management. This data was based on a survey of 78 hospitalized older patients with persistent pain. Pharmacologic intervention needs a multimodal approach or needs two drug categories to reduce pain. According to a WHO guideline (2007) prescription drugs are overused and non-pharmacologic pain management is not even considered. Hence, both pharmacologic and non-pharmacologic pain management should be given together to reduce pain. Therefore, student

nurses should have enough knowledge in both pharmacology and non-pharmacologic pain management. Currently, pain management in nursing curriculum in Academy of Nursing do not provide student experience practicing both non-pharmacology and pharmacology technic in laboratory. Hence, student nurses need to learn more about pain management. There are also barriers to learning pain management since there are no guidelines or standard operational procedures about non-pharmacology techniques and pharmacology in hospitals.

Pain Education Issues

A study by Bond (2011) found there are some problems with pain management in developing countries. The problems are lack of abilities for pain management, low education about pain for health professionals and limited access to pain relief drugs. A survey by IASP in developing countries found barriers on good pain management: "lack of education 91%, government policies 74%, fear of opioid addiction 69%, high cost of drugs 58%, poor patient compliance 35%, and others 11%" (Bond, 2011, p. 40). Other problems about pain management education are different cultures. A study by Suwanraj (2010) stated that Thai nurses did not perform pain assessment well or take notes on pain management. Coker et al. (2010) studied six acute care medical units and found assessment and pain management was not performed well and standard guidelines weren't used in the acute medical unit. Other studies report that there is a misconception between nurses about side effects of narcotics from pharmacologic management. Dihle et al., (2006) states that nurses who took an active approach on pain management will reduce the gap between what they said and did on pain management. Furthermore, research states that nurses and health professionals educated on pain management will get positive effects on increasing their abilities to assess and manage pain.

Other issues that have developed in regards to pain management are how to apply the guidelines for pain management in every age level. The pain assessment scale provides good

guidance to ease assessment; however, it is important to consider the same documentation and perception among nurses who work in emergency rooms, critical care units, surgical wards, and neonatal rooms. This is challenging for hospitals especially in Indonesia that want to get accreditation for JCI. According to JCI standards hospitals should provide pain management and documentation as proof. In other words emergency rooms and other units in hospitals should have the same perception and documents about pain management. Therefore, different cultures of pain management make different choices of methods. Asian cultures develop CAM, herb therapy, acupuncture, and coining to reduce pain. However, there is only a small amount of evidence about these methods. Culture influences patients' beliefs about experiences with pain. Javanese people are more polite than other cultures in Indonesia; hence they may not express just how much pain they are in or their feelings about pain. Nurses should have deep learning about culturally acceptable pain management. Indonesia has a lot of different cultures that influence people seeking pain management, Javanese people are familiar with using herbs and coining as pain relief. Javanese people are using herbs also for post musculoskeletal surgery. Hence, educating nurses about pain management through evidence based practice will be challenging for health professionals.

Discussion

Researchers found that there is a lot of evidence that pain management relieves pain. However, studies have also found that several nurses did not have enough knowledge of assessment and pain management. Also, there are still misconceptions about using opioids as pharmacology pain management. Studies also reported that pain management documentation for pain management is not good enough. Educating nurses and health professionals on pain management showed positive results for increasing their knowledge and abilities to assess and give pain management. The challenges for nurses to develop pain management are on

implementing evidence based practice guidelines. Furthermore, nurses in developing countries also have barriers with implementing pain management due to different cultures. Patients' cultures will influence patients' views or beliefs about pain.

Conclusion

In summary, educating student nurses on pain management needs collaboration with other health professionals and the challenges these symptoms poses. The pain assessment scales need to be adjusted based on individual languages and cultures. Furthermore, there needs to be more research on pain management strategies for different cultures such as those in rural areas. All nurses should learn about other healing modalities that might positively influence pain management, such as energy healing, and other CAM methods. Student nurses may be the leaders in pain management with pain concepts and management being addressed throughout their nursing curriculum. The current student nurses in academy of nursing have 0.5 credits learning about pain management theory and practice about pain management during their clinical rotations. There are no specific competencies on assessing and management pain for student nurses. Hence, it needs to improve their knowledge about pain before practice to reduce gap between education and hospital. This is just the beginning of what nurse educators in Indonesia see as an important addition to the nursing curriculum. Do not forget to assess all vital signs, include pain.

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